

# RESULTS OF TWENTY-FIVE YEARS' COLLECTING IN THE TACHINIDÆ, WITH NOTES ON SOME COMMON SPECIES.

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A recent rather careful inventory of my collection in this family was made the basis of further studies, which seemed of general interest and are presented in this paper.

First a few personal words about my collecting.

I began to collect insects in 1888. In my first two seasons I collected everything without discrimination; but in the spring of 1890 I definitely selected the Diptera as my specialty and began a private collection in them, still for many years continuing to make a general collection for my institution. In the fall of 1890 my attention was directed especially to the Tachinidæ through meeting in Washington Mr. C. H. T. Townsend, who was already specializing in them. For several years I sent him material. The appearance of Coquillett's Revision of the Tachinidæ in 1897 gave a new impetus to my collecting in the family; within a few years he had named a large number of species for me, by the aid of which I gradually acquired sufficient knowledge of the characters to determine for myself within narrow limits. I mention these beginnings merely to show that I have since possibly the first year of the twenty-five paid much more than casual attention to this family.

I should preface my statistics with the remark that I have about the same general conception of species and genera as that of Coquillett in his Revision, and that I use mainly the nomenclature of that work. The total number of North American Tachinidæ in the collection is about 260 species, but I leave out of account in the following figures some 25 species not determined.

Total number of named N. A. species.....	232
Supposed new species among these.....	31
Difference, assigned to named species.....	201
Genera represented.....	103
Species collected by myself.....	185
Total number of species in collection from Rocky Mountain and Pacific Slope regions.....	143

Following are the species collected by myself in the different regions in which I have lived:

Collected in South Dakota, 4 seasons.....	35
At Lawrence, Kans., first half of 1 season (1893).....	19
In Idaho, 20 seasons.....	91
In California, first half of 1906.....	21
In Indiana, 1½ seasons.....	64

The following figures show something about the relative abundance of species:

Represented by one specimen.....	66
By two specimens.....	24
By three specimens.....	23
By four specimens.....	21
By five specimens.....	11
By six specimens.....	13
By seven specimens.....	11
By eight or more specimens.....	63

From the figures just given, it appears that about 25% of the species are represented by a single specimen, an equal proportion by eight or more, and that the other 50% fall between these extremes. The strikingly large number represented by a single specimen may be in part explained by the fact that my entomological friends have sometimes favored me with a rarity of which they could spare but one: Professor Melander has in fact often divided with me when he had but two specimens. So I re-examined the 66 cases, and found that only 41 were collected by myself, and 25 by others.

During all the period of my collecting I have been trying to get long series, especially in recent years. Therefore it seemed surprising that I could show eight or more specimens in only 63 species—the more so as in many of these I had only found the insect a time or two in all my experience, as in *Dichocera lyrata* Will., *Paradejeania rutilioides* Jean., and others. Immediately the question arose. How many really common species of Tachinidæ occur in the United States, and which are they?

Taking my 63 species as a tentative list, I asked Messrs. C. W. Johnson and W. R. Walton to make similar ones, enumerating the species which they had found either generally or occasionally common; Mr. Johnson named 52 species and Mr. Walton 71. About the same time while doing some work in the Illinois collection at Urbana I listed 29 named species which were represented by eight or more specimens; and on a brief visit to

Professor Melander I made a very incomplete list of 23 species among his duplicates. This gave me five lists, of which two were largely western and two eastern.

The total number of species mentioned in these lists is 107; of these only 15 were mentioned in all the lists and seem therefore entitled to rank as the commonest Tachnids of the United States; 9 were mentioned four times, and hence may be considered as almost as common; 9 more were mentioned three times, indicating that they are fairly common; 24 were mentioned twice and 50 only once—these two classes have their periods of abundance, as many other species no doubt have, but are not generally or even frequently common. These indications are given as approximations only, conceding that further study of the matter would tend to increase the number of the common group.

Taking them as they are, however, some rather striking facts about their parasitic relations will appear. I give a few notes about the first class, which occurred in all the lists:

*Cistogaster immaculata* Macq. Adults are collected on flowers throughout the summer, and are in every collection. There is no trustworthy record of the rearing of this species, nor so far as I can find of its European congeners; its evident close relationship with the following species suggests the Pentatomidæ as its hosts.

*Gymnosoma fuliginosa* R. D. Adults with the preceding, and equally common. Has been bred in Arizona from nymphs or adults of *Pentatoma sayi*, and again in New Mexico from the same host (the latter an unpublished record of the Bureau of Entomology). It lays an egg on the prothorax of the bug.

*Phoranthia occidentis* Walk. The most abundant of all Tachinidæ; I collected 328 specimens in 20 minutes on October 23, 1914, by sweeping the flowers of *Chrysanthemum leucanthemum* near La Fayette. Nearly all my dated specimens were taken in September and October, and from flowers of composites. It has been reared on September 11, 1913, by F. B. Milliken, from *Nysius angustatus* Uhler, one of the False Chinch Bugs (unpublished record). One of its European allies (*Phasia hemiptera*) attacks adult beetles, inserting an unincubated egg by means of a sharp ovipositor. *Occidentis* is probably a single-brooded species.

*Myiophasia aenea* Wied. This is the least abundant of the fifteen; in spite of the fact that it is included in all the lists, I have never seen a good, long series. It has been bred several times from beetle larvæ.

*Senotainia rubriventris* Macq., and *trilineata* V. d. W. These are always common, especially the latter, on sandy soil in summer, where wasps dig their holes. Presumably they parasitize these Hymenoptera, as their European congeners do, but none have been bred in this country.

*Ocyptera carolinæ* R. D. Common on flowers in late summer, especially on goldenrod. It has been bred once from a grass-hopper. It makes a fair counterfeit of *Ammophila* when feeding on flowers, with its black and silvery colors and red abdomen.

*Panzeria radicum* Fabr. This robust species occurs on flowers from April throughout the summer. It parasitizes caterpillars, and has been found to be single-brooded, wintering in the puparium.

*Tachina robusta* Townsend. A large species found only in spring, often on willow bloom, or sitting on the bare ground. It has been bred from larvæ of moths, and is presumably single-brooded.

*Winthemia quadripustulata* Fabr. Undoubtedly our most abundant Tachinid parasite of lepidopterous larvæ, from many species of which it has been bred. The adults are very common on foliage.

*Paradidyma singularis* Tns. Only moderately but persistently common. Bred from burrowing webworms by Forbes in Illinois (unpublished record).

*Gonia capitata* De G. A very early spring form, even earlier than *Tachina robusta*. In my experience, the dark form occurs only in spring, while in late summer there is a less common form with yellow abdomen; this if sustained by more careful study would argue for specific distinctness, corresponding more or less to Williston's species. Bred from cutworms—the spring form.

*Microphtalma disjuncta*, Wied. Adults found on bare ground in June and July. Not very common westward, perhaps not occurring at all in the Pacific Northwest, although it occurs in the Southwest. Parasitic on larvæ of *Lachnosterna* and presumably in the Southwest on allied genera. Probably single-brooded.

*Archytas analis*, Fabr. Adult on sweet clover and golden-rod in midsummer. Has been bred from tent caterpillar and army worm.

*Echinomyia algens* Wied. Adult with the preceding. Has been bred from a cutworm.

The *second group* of species, mentioned in four of the five lists, is as follows:

*Trichopoda pennipes* Fabr. This appears to occur from Argentina to about the latitude of Kansas, and still farther north to the eastward, but not in the northwest. It has been bred from *Anasa* and *Leptoglossus*, plant-feeding Heteroptera.

*Cryptomeigenia theutis* Walk. Very widespread but not abundant. The adults of *Lachnosterna* are attacked, and presumably allied genera in regions where *Lachnosterna* is not represented.

*Linnæmyia comta* Fall. Abundant on foliage; has been reared from cutworms, and from *Laphygma frugiperda* (the latter an unpublished record of the Bureau). This species perhaps more than any other in the second group deserves a place in the first, from its very wide distribution. It has however been bred only a few times.

*Euphorocera claripennis* Macq. Except for the fact that I did not find this species well represented in the Illinois collection, I should have placed it in the first group; my impression is that it is a close second to *Winthemia quadripustulata* as a parasite of lepidopterous larvæ; it has been reared from many species.

*Metachæta helymus* Walk. Persistently common, but not abundant. Adult on foliage. Until the past summer this species had never been bred, but Mr. Gahan and Mr. Hyslop both reared it this year from the Army Worm in Maryland (unpublished records).

*Metopia leucocephala* Rossi. Adult on low foliage and on the ground. Common throughout the summer. Has not been bred in this country, but in Europe, where the species also occurs, it has been reared from nests of *Bembex*, *Halictus*, and *Philanthus*, burrowing Hymenoptera.

*Spallanzania hesperidarum* Will. Not generally abundant, though widespread. A butterfly parasite.

*Peleteria tessellata* Fabr, and *robusta* Wied. Both very common species on flowers throughout the country, all summer long. *Robusta* has been bred from *Leucania unipuncta* by



Vickery at Brownsville, Tex.; from *Chorizagrotis agrestis* by Kelly at Wellington, Kans.; and from *Paragrotis ridingsiana* by Doten at Austin, Nev. (Unpublished records). *Tessellata* is so closely allied that it undoubtedly attacks Lepidoptera, though not yet reared.

Omitting the less common species, there are a few facts to be emphasized in the ones above discussed.

First, among twenty-four commonest North American Tachinidæ, twelve are known to parasitize Lepidoptera, three each the Coleoptera and Hemiptera, one each the Hymenoptera and Orthoptera; while in four the larval habits are unknown, only one of these last however probably attacking the Lepidoptera.

Second, that several of these species are probably single-brooded. Parasitism seems in these cases to have restrained within narrow limits the ordinary, primitive exuberance and rapidity of Muscid development. The economic importance also of the species is materially affected by this limitation.

Third, that the natural history of these species is mostly unknown or at least unpublished. While some progress has been made in studying the internal anatomy of the females and making out the stage of advancement at which the young are deposited, there is a great lack so far of field work on the reproduction, as well as of dissection of infested hosts to ascertain the mode of life of the larvæ. There should be more workers in this field. Merely to find and record a fly in the breeding cage where a cutworm moth was due is but a small contribution, though a useful one, to the biology of the fly. Mr. Walton's interesting published observation on larviposition in *Chætophleps setosa* Coq., the cucumber beetle parasite,\* illustrate the sort of beginnings we must have in order to handle the subject properly. Hence in conclusion I cannot too strongly commend to the rising generation as a research subject the biology of parasitic diptera, in which there are many discoveries to be made, of both scientific and economic importance, and of general interest as well.

My acknowledgments are due to Dr. Webster for permission to use unpublished records, and to Mr. Walton for generously furnishing them in advance of his forth-coming new host index of Tachinidæ.

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\*Mentioned in his article as *Neocelatoria ferox*.